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ABSTRACT

This paper examines the new demands made by industries' human resource management for retraining of their employees to meet the consequences of technological change and what this means in terms of the content of educational programs and new markets for educational institutions. Some joint ventures between educational institutions and industry in Europe that have attempted to bring some solutions to these problems are reviewed. Changes in the climate of education institutions, cover the changes seen in the climate of educational institutions, changes in the economy and labor market, the market for further education and the problems involved in attempting to enter that market are discussed. The question of educational institutions changing their attitudes toward retraining is also discussed, and examples of practical initiatives by individual institutions and companies are cited. Contains eight references. (GLR)

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Jean Endo
Chair and Editor
Forum Publications Editorial
Advisory Committee

NEW TECHNOLOGIES, THE CHALLENGE OF CONTINUING EDUCATION TO OUR INSTITUTIONS

Abstract

Recent reports such as "Made in America" (Dertouzos et al., 1989) and "New Technologies in the 1990s" (OECD, 1988) stress the weaknesses in companies' human resource management as, reflected in productivity problems in American and European industry.

The concept of life long education is not yet an integrated part of corporate strategies, especially in smaller companies. Looking at the '90s and beyond, our educational institutions should prepare themselves for a different relationship with industry. Life-long learning is becoming essential and educational institutions are being challenged to enter the market of (re-)training. Furthermore, a change of emphasis is to be expected in the content of initial education as well as in training programmes.

The purpose of this paper is to draw attention to the consequences of technological changes and new demands in human resources management in industry for the content of our educational programmes.

This paper examines some joint ventures by institutions and industry in Europe. These examples can help to make our institutions more creative.

Introduction

The OECD-report on New Technologies in the 1990s argues that technological change is a social process and that the potential benefits can be fully exploited only if technical change is accompanied by appropriate structural and institutional reforms. One of the key issues in the 1990s will be the reorganization and effective integration of human resources and changing technologies within companies.
The above means that for educational institutions, retraining can be an interesting new market.

1 Changes in the climate of educational institutions

There are varied reasons for institutions to look for other 'educational markets'. The first reason is that governments in most OECD-countries have economized on their spending on Higher Education while asking for more quality, higher output, etc. The effect is that the HEI's have to do more with a drastically decreased budget. On top of this cost-cutting policy by governments we see a demographical decline. There are fewer young people entering the education system. So institutions are forced to reorganize somehow and look for new opportunities.

A third reason is that the relation between education and the labour market is becoming so dynamic that the institutions have to develop a more responsive attitude towards the labour market. Entering the market of further education can, as we will see, provide a very direct and dynamic source of information about new developments in working practices. This can be very useful for adapting and upgrading the content of initial education.

2 The market for further education

The market for retraining in most OECD countries has been growing during the last decade. After a period of stabilisation further growth is expected. There are several reasons for the growing interest in further education.

New technologies

The first reason is the rapid development and application of new technologies, due to increased R&D efforts in the market sector and improved knowledge transfer between the private sector and the research institutes. Product lifecycles are shortening and new production technologies as well as new products appear at ever-decreasing intervals. At the one hand this leads to an increasing demand for specialistic skills and knowledge. However these have to be updated freguently to

prevent rapid outdating. On the other hand an important consequence of the new production techniques is the integration of professional disciplines (for example mechatronics, telematics and psycholinquistics). This requires broader knowledge and skills. Broader skills and knowledge are also needed to communicate and co-operate with other disciplines.

Changes in the economy

The second reason is the need for the company and the employee to adapt rapidly to changes in the economy. Among these changes are increased internationalization, a shift to 'tailor made' production and concentration on core activities which lead to greater dependence on suppliers and buyers and therefore a growing importance of 'just in time' delivery. To be able to adapt to these economic changes, companies as well as their employees have to learn to act more strategically. At the moment industrial productivity is hampered by short time horizons, a preoccupation with short-term returns on investments and over-reliance on the domestic market. Part of the new strategy that most companies have yet to develop consists of permanent education of their employees. OECD-reviews of recent economic development in OECD countries stress the necessity of recurrent education and learning, especially for the lesser skilled workers.

It is obvious that adaptations not only in corporate human resources management but also in institutional learning are necessary to provide young people who are able to 'keep on

learning'. However, many of the weaknesses related to the productivity problem in industry are reflected in the educational institutions.

Changes within the labour market

The third reason is found in changes within the labour market. Because of demographical decline, in a few years' time there will be fewer young people entering the labour market.

Even now there is a mismatch between supply and demand. On the one hand we see structural unemployment. These unemployed people often have an out-dated or unsuitable education and they have to be further educated before they can start working. On the other hand there is an unmet demand for skilled workers. This 'gap' will grow when training problems can no longer be solved by simply hiring new people and new knowledge can no longer be obtained by hiring people who have just finished their education. Consequently there has to be more attention to education and development for those already working and the importance of human resource management will grow.

3 Problems entering the market

So far we have seen that educational institutions have to look for new markets and that there appears to be a growing new market in further education. In this market, institutions

have to compete with in-company activities and private retraining companies. What are the opportunities and obstacles for successful operation in the training market?

Problematic competitive position

When competing with private retraining companies, we have to admit that educational institutions are hampered by a lot of 'red tape' concerning budgets, faculty salaries, assessment and so on. Therefore the possibilities for contract research and contract education are limited. In a competitive market, institutions have to be able to answer specific demands. Therefore they have to react fast and flexibly to changes in demand. Deregulation is a part of government policy in almost every OECD country. The amount of autonomy given to individual schools has grown, but not enough. To operate successfully in the training market, deregulation must go further towards independence, enabling them to decide how to invest in opportunities. Only then can they react in a flexible way to changes in the market.

Poor marketing is another aspect of the competitiveness of institutions. As long as enrolment is reasonably safe, institutions are not forced to be more active in fields other than initial education. Over recent years we have however seen a shift towards strategic planning, defining institutional missions, targets etc. A marketing strategy is developing but, we think, not yet adequately implemented.

Inadequate communication between supplier and customer

A second obstacle for institutions is the inadequate communication between industry and institutions. Part of this problem is caused by the relatively poor marketing of the institutions mentioned above. They often offer a supply of retraining programs without knowing how the market of futher education really looks like.

Another cause for the inadequate communication is the fact that companies often can't articulate their specific demands with regard to education and training.

Opportunities

Despite the number of obstacles, institutions also have some good opportunities to operate succesfully on the retraining market. Compared with many private retraining companies, institutions are considered quite thorough and are respected for their quality. They also have a great deal of pedagogical and educational expertise. Futhermore institutions can work relatively cheap in a market where prizes are growing high.

4 Retraining activities and demands

In order to get a clearer view on the retraining market a research on retraining activities of Dutch companies was carried out on commission of the Ministery of Economic Affairs.

Table I shows the strong relation between retraining activities and the size of an industrial company. For the service sector this relation is less clear.

Table I: The significance of retraining; categorized by company size

	Percentage of staff that participates in retraining courses					
size (number of employees)	0%	1 to 10%	10 to 25%	25 to 40%	more than 40%	not known
n = 2162 Industry						
10-19	46,1	32,6	12,8	0,8	0,7	7,1
20-49	32,9	43,6	14,5	2,7	1,0	5,3
50-99	13,8	60,9	18,9	4,3	0,7	1,4
100-199	5,9	61,7	24,1	3,3	3,7	1,3
200-499	3,5	53,5	27,0	7,1	6,7	2,2
500 or more	0,6	42,4	29,9	13,1	10,9	3,1
Total industry	29,5	45,0	16,4	2,9	1,6	4,6
n = 4329 Services						
10-19	40,4	31,0	15,0	5,1	4,7	3,9
20-49	34,0	36,3	18,8	4,7	3,6	2,6
50-99	20,0	43,3	22,5	5,8	5,9	2,5
100-199	7,8	58,9	19,6	6,5	3,8	3,5
200-499	3,2	43,4	24,9	15,6	9,7	3,2
500 or more	0,0	46,8	30,6	8,1	9,8	4,7
Total services	32,6	36,0	17,8	5,4	4,6	3,6
Total	31,8	38,2	17,4	4,8	3,8	3,9

source: SEO, 1990

Table II shows the relation between retraining activities and branches. Banking and insurance companies have a high retraining intensity. Within industry the same can be said of the chemical and metal branches.

Table II: The significance of retraining categorized by branches

branche	Percentage of staff that participates in retraining courses					
	0%	1 to 10%	10 to 25%	25 to 40%	more than 40%	not known
n = 2162 Industry						
Food and beverages	31,7	47,0	13,3	2,3	0,7	5,1
Textiles and leather	41,9	40,9	5,3	0,6	1,5	9,8
Wood and construction	37,8,	45,8	8,4	0,1	0,7	7,1
Paper and printing	23,9	44,5	21,2	5,3	0,8	4,4
Chemical, synthetics	27,6	41,7	17,8	4,8	3,1	4,9
Metal	26,2	46,6	19,3	3,1	2,2	2,7
Other industry	31,5	34,7	22,5	3,7	1,1	6,6
Total industry	29,5	45,0	16,4	2,9	1,6	4,6
n = 4329 Services						
Public utilities	3,4	50,4	26,8	11,9	3,8	3,7
Construction	34,4	41,0	16,2	3,6	2,3	2,5
Trade	36,1	33,5	15,0	5,5	5,4	4,5
Hotel, catering	39,5	29,4	18,8	7,0	4,2	1,0
Transport and communication	42,5	38,2	10,5	2,1	2,7	4,1
Banking and insurance	10,3	33,4	28,2	12,3	10,8	5,0
Other commercial	21,9	37,2	25,0	6,6	5,5	3,9
Other non commercial	28,9	34,3	18,1	5,3	4,8	8,6
Total services	32,6	36,0	17,8	5,4	4,6	3,6
Total	31,8	38,2	17,4	4,8	3,8	3,9

source: SEO, 1990

This survey shows that retraining activities and thus retraining demands depend upon the size of a company and its branch. More generally we could say that there are two kinds of customers.

There are (mostly larger) companies who are fairly active in the retraining market. They often have a clear view of what they need and they see to it that they obtain their retraining facilities, from an institution, a private institute or by organizing in-company training themselves. These companies also know what they really want from initial education. Most of them are only interested in the level of education when they recruit someone. Specific skills are learned on the job within the company. They want people who learnd to 'keep on learning' during their initial education, that is people who are flexible.

On the other hand there are a lot of (mostly smaller) companies who don't have a retraining tradition. They are beginning to see the necessity of retraining but they don't act upon it yet. They don't put enough effort into it in terms of time and money. Therefore they are not very active on the retraining market and they also do not have a clear demand. The individual companies do know what they want from initital education. The problem is that they all want the institutions to deliver specialist 'tailor made' for their company, so employees can be productive from the first day. These companies neither have the money nor the time to train newcomers as specialists 'on the job'.

Both kinds of customers have a common characteristic in that, until a little while ago, they felt no responsibility for the contents of the educational system and the fit between education and the labour market. They were just not satisfied with the current educational system.

5 How institutions should react

We have seen that both companies and educational institutions have to change their attitude towards retraining. Companies have to find other ways to communicate with the institutions. They have to articulate their needs or at least transfer their knowledge on developments in their line of business. Otherwise institutions cannot react propperly. Here we focus on the institutions and the way they should react.

In their study "Made in America" (Dertouzos et al., 1989) the leaders of the MIT Commission on Industrial Productivity warn against the underestimation of human resources becoming a self-fulfilling prophecy: "for it translates into a pattern of training for work that turns out badly educated workers with skills that are narrow and hence vulnerable to rapid obsolescence". In other words: the more you try to fulfil the specific wishes of every single customer, the poorer the connection between education and labour market will be. After all, to fulfil the wishes of every customer you first have to find out what every demand exactly implies for the different curricula within the institution. Due to the fast

changes in technology, mentioned before, by the time the student leaves school the specialist skills will be outdated. This means a waste of energy and money for both the students and the institutions.

Institutions do not yet have the appropriate answer to the changing demands of industry. They do not prepare our students for recurrent learning nor for the necessity of changing skills more than once in a life time. And what is worse, they let short-term pressures interfere with setting long term goals in measuring the quality of their product (students), faculty members and programmes.
While there is evidence that breadth of skills and greater flexibility of the working population improve industrial performance, our institutions continue to supply the labour market with highly specialized graduates and even try to develop new specialities as well.
Whereas industrial management has to provide for training and retraining of their employees, the institutions have to redefine the content of initial education. The school system as a whole is challenged to prepare young people for a higher level of change and uncertainty in career patterns. The fundamental changes needed in the interrelation between initial education and later training have to be implemented in a practical way. Academic discussions about principal boundaries between school and workplace teaching or between government responsibility and the responsibilities of industry can only obscure the real issue: to make the best of

the enormous potential of human resources and to benefit from the technological opportunities that the 1990s will have in store.
We believe that this can best be done by thinking in terms of a free market. Both sides have much to gain by communicating when there is a clear relation between investment and benefits.

6 Some examples

In research, as well as in our own experiences, we learned a great deal about very practical and innovative initiatives by individual institutions and companies. Therefore, we can give some examples of successful joint ventures between institutions and industry. From these examples we can learn about the fruitful interrelation between "partners" when industry and educational institutions meet in the (re-)training market. By training people who are already employed, institutions keep pace with the ever changing workplace. This experience can be translated into initial education. Joint ventures can improve the quality of the faculty, the educational programmes, and infrastructure.
Of course, industry can also benefit from these joint ventures; it is in its interest that the fine balance between the initial education of new employees and the training of its workers is optimal. Also, the expertise of educational institutions can help companies formulate their requirements

for (re)training. We will see that these joint ventures challenge institutions to rethink their goals and to go for active marketing of their specific know-how. We also mention some experience we have had with government policies supporting this kind of public-private joint ventures.

The case of a regional automation practice centre

In the Netherlands, as in many other OECD-countries, the policy towards retraining is simple: companies are themselves responsible for retraining their employees. It is supposed to be an integral part of their business strategy. The government only helps to build up an adequate infrastructure for retraining and sees to it that this is used in an optimal way.

As noted before, the small and medium sized enterprizes do not have a retraining tradition and therefore do not have or use the available infrastructure. Furthermore Dutch institutions in general do not operate very successfully in the retraining market: only 10% of this market is served by them. This despite the fact, as noted above, that greater concern with the retraining market upgrades the quality and practical value of initial education. Therefore the Ministry of Economic Affairs decided to stimulate the establishment of so-called 'regional automation practice centres'. We would like to discuss one of these which is very successful, the Training Institution for Technology and Informatica' (TITI).

TITI is connected with a technology college and started in 1986 with a course on flexible production automation. It now has several different courses, all with the same characteristics:

1. The courses cover the practical and theoretical skills needed to handle new technology. This means that TITI needs modern (and thus new) equipment.
2. TITI has shown itself capable of engaging the suppliers of the equipment (mostly machinery) involved. This involvement means a reduction in equipment costs and help with developing and adjusting the curricula. It also gives feedback on important new technological developments.
3. The retraining courses are specially made for the region's companies (which are mostly SME's).
4. The equipment bought for the retraining course is also used for initial education. In this way the initial educational programme is updated and partly sponsored (through the equipment) by the regional economy. A better fit between education and the regional labour market is the result.
5. There is a ripple effect on other institutions in the region. The transfer of knowledge from TITI to these other institutions leads to upgrading of the content of initial education and changes in current curricula. Further more the other institutions are free to use the new equipment for their own initial education or retraining activities. In this way TITI serves as a real regional automation practice centre.

The case of an information technology pilot project

The Dutch government, like other OECD governments, wants to stimulate education and research in the field of information technology. In the Netherlands this is done through the so called "pilot policy". The purpose of this policy is to create high-profile centres of excellence in the field of information technology at Higher Vocational Institutions.

One of the pilot projects is in Computer Integrated Manufacturing (CIM) in Rotterdam. The aim of this project is to integrate several computer aided systems into one operational concept that is useful in modern industry.

The CIM project has some interesting characteristics.
1) Computer Integrated Manufacturing is of great importance to technological and management innovation in industry. Therefore industrial companies are willing to participate.
2) The participating companies, the government and the institution each pay one third of the project costs.
3) Most of the money is used to equip a new laboratory with the latest machinery.
4) There is a far-reaching integration between research and education. The companies and the institution work together to develop the new concept and to translate it into new curricula for initial education.

5) There is significant feedback to industry, which helps the participating companies to formulate their retraining demands in this field. In contrast to the "normal" situation, initial education does not lag behind developments in industry.

7 Concluding remarks

The retraining market is an important and growing market. Institutions are only able to operate successfully in this market if deregulation goes further, so they can act autonomously and respond in a fast and flexible way to changes in demand.

To get a better fit between supply and demand in the educational market, the companies have to be more clear in what they want, both in the initial and further education stage.

From the case studies of successful joint ventures between industry and institutions, we learned that the boundaries between initial and further education should be less sharp than they are now. Initial education has to include links with further education. Some educational systems, such as that of West Germany, are based upon this idea. But even in non-dual systems there are possibilities for a better interrelationship between education and the labour market.

Vouchers for specialized courses

One could, for example, shorten initial education. Every student who leaves school would receive a certain quota of so-called 'vouchers', giving him or her the right to return to school afterwards to follow some specialized courses. The idea is that people should start to work while they are generalists. After some time they would finish their education by taking some specilized courses that are directly useful in the labour market. In this way the employer gets involved with education and can help to determine what a specialist course should contain if it is to respond to the wishes of the current labour market. At the same time, the employer can discover what the limits are of a specialist course. If he only wants the employee to learn how to manage the new unique machine he just bought, he has to pay for it (as a contract activity). But if he wants his employee to learn something that is useful to both the company and the employee he gets it 'free' in turn for a voucher.
Another advantage is that the employer gets used to (further) education and will more easily decide to 'further educate' other employees.

In our view this idea could be carried out without much difficulty. It is the institution itself that changes its curriculum from 'learning only' to a combination of learning and working.

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